

## Overview of Risk Factors for Stroke in Stroke Patients in Work Area at Technical Implementation Unit of the Linggang Bigung Public Health Centre

Nova Karlina, Tini, Edi Purwanto

Student of Bachelor of Applied Nursing Program, Lecturer of Nursing Department,  
Politeknik Kesehatan Kementerian Kesehatan Kalimantan Timur, Indonesia  
[novajeaneon@gmail.com](mailto:novajeaneon@gmail.com), [tinizr17@gmail.com](mailto:tinizr17@gmail.com), [prassetiawan41@gmail.com](mailto:prassetiawan41@gmail.com)

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### Abstract

**Introduction:** Stroke is one of the main health problems, not only in Indonesia but in the world. Stroke occurs when the brain's blood vessels experience a blockage or rupture which results in part of the brain not getting the blood supply that carries the necessary oxygen so that cell/ tissue death occurs. **Objective:** The purpose of this study was to determine the risk factors for Stroke in Stroke patients in the Linggang Bigung Health Center working area. **Methods:** This study used a descriptive retrospective research design, with a sample size of 22 respondents. **Results and Discussion:** The results of the study obtained as many as 7 respondents (32%) each with the latest education not in school and elementary school. The majority of 14 respondents (65%) were >55 years old, with the majority of 13 respondents (59%) being male, 16 respondents (73%) had no family history of Stroke, in this study all respondents had hypertension, 13 respondents (59%) had DM, 18 respondents (82%) each smoked and consumed alcohol, while 21 respondents (95%) were not obese. **Conclusion:** In this study most, respondents were aged >55 years, male gender, had smoking behavior and alcohol consumption and all respondents in this study had hypertension.

**Keywords:** Overview of Risk Factors; Stroke; Stroke Patients;

## **Introduction**

Stroke is one of the main health problems, not only in Indonesia but in the world. Stroke is the second leading cause of death and the third leading cause of disability in the world. According to KBBI (2016), stroke is a brain attack, which is usually accompanied by paralysis. Stroke according to WHO (2020) is a condition in which rapidly developing clinical signs are found in the form of focal and global neurological deficits, which can be aggravating and last for 24 hours or more and or can cause death, without any other obvious cause other than vascular.

Stroke occurs when brain blood vessels are blocked or ruptured which results in part of the brain not getting a blood supply that carries the necessary oxygen so that it experiences cell/tissue death (Maukar, Ismanto, & Kundre, 2014). Stroke has a very detrimental impact on the sufferer himself, the most common impact of stroke is among others paralysis of the limbs, face Perot or face *drooping*, visual disturbances, swallowing disorders, impaired tactile sensations, and speech disorders. One of the effects of the stroke is that speech disorders are one of the symptoms of stroke itself.

Speech disorders or often referred to as motor aphasia which are characterized by not fluent speech and seem to make efforts when you want to speak. Speech disorders in stroke are caused by paralysis of the nerves and motor muscles that regulate the movement of the lips and tongue, causing disturbances in speech (cedal) in stroke patients. Paralysis in this muscle causes disturbances in the process of producing sounds in speech (Fingiyah, 2017).

The prevalence of stroke according to *World Stroke Organization* data shows that every year there are 13.7 million new cases of stroke, and about 5.5 million deaths occur due to stroke. About 70% of stroke and 87% of deaths and disabilities due to stroke occur in low- and middle-income countries. Over the past 15 years, strokes have occurred on average and caused more deaths in low- and middle-income countries than in high-income countries. The prevalence of stroke varies in different parts of the world. The prevalence of Stroke in the United States is about 7 million (3.0%), while in China the prevalence of Stroke ranges between (1.8%) (rural) and (9.4%) (urban). Worldwide, China is a country with a high mortality rate due to stroke (19.9% of all deaths in China), along with Africa and North America (Idris, 2018).

In Indonesia based on the results (Riskesdas, 2018) the prevalence of stroke increased compared to 2013, from (7%) to (10.9%). Nationally, the prevalence of stroke in Indonesia in 2018 based on a doctor's diagnosis in the population aged  $\geq 15$  years is (10.9%) or estimated at 2,120,362 people. Based on age group, the incidence of stroke occurs more in the age group of 55-64 years (33.3%) and the proportion of stroke sufferers is the least age group of 15-24 years. Men and women have almost the same proportion of stroke incidence. Most of the population affected by stroke has completed school education (29.5%).

The prevalence of stroke living in urban areas is greater (63.9%) compared to those living in rural areas (36.1%) (Ministry of Health RI, 2018). The East Kalimantan region is the highest region with stroke disease (14.7%), followed by Yogyakarta

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(14.3%), Bangka Belitung and DKI Jakarta respectively (11.4%) and Bali is in 17th position with (10.8%) (Riskesdas 2018). The results of a preliminary study in the Working Area of Technical Implementation Unit Linggang Bigung Public Health Centre, West Kutai Regency, showed that the data on stroke patients consisted of 24 men and 20 women.

So many factors that can affect the incidence of stroke, risk factors for stroke are further divided into risk factors that can be changed and risk factors that cannot be changed. Risk factors that cannot be changed and controlled influence on the incidence of stroke, including heredity, race, age, and gender. While Risk Factors that can be changed are Hypertension, cardiovascular disease, Diabetes Mellitus, smoking, alcohol, increased cholesterol and obesity (Maukar et al., 2014).

Research by Suwaryo, (2019) shows that there is an influence of physical activity, regular blood pressure control, and stress with the incidence of Stroke While research (Sari, 2021) found that factors that influence the incidence of stroke are age, hypertension, diabetes mellitus, family history and obesity. In contrast to research conducted by (Wati, 2021) shows that there is no relationship between smoking, physical activity, adherence to treatment and adherence to treatment with the incidence of stroke.

Researchers conducted a preliminary study in the Working Area of Technical Implementation Unit Public Health Centre Linggang Bigung Data obtained from the Technical Implementation Unit Linggang Bigung Public Health Centre as follows, stroke patients are spread across eleven villages which are the working areas of the Technical Implementation Unit Linggang Bigung Public Health Centre. These villages include Tutung Village with Stroke there are 6 people, Linggang Melapeh Baru Village there are 5 people, Linggang Melapeh Lama Village there are 7 people, Bigung Baru Village has 1 person, Linggang Purwodadi Village has 5 people, Linggang Bigung Village has 8 people, Linggang Mapan Village has 4 people, Linggang Amer Village has 6 people, Lingang Kebut Village has 1 person and Linggang Mencelew Village has 1 person. The general purpose of the study was to determine the description of risk factors for stroke in stroke patients in the working area of Technical Implementation Unit Linggang Bigung Public Health Centre.

### **Method**

Research place in the Technical Implementation Unit of Linggang Bigung Public Health Centre. The study time began in February 2022. This study uses *a retrospective* descriptive research design, which is research where data collection of dependent variables is carried out first, then measured independent variables that have occurred in the past

The population of this study was stroke patients who were under treatment at the Technical Implementation Unit of Linggang Bigung Public Health Centre for the period January 2021 to December 2021 as many as 22 people. The sampling method in this study is Total Sampling.

**Overview of Risk Factors for Stroke in Stroke Patients in Work Area at Technical Implementation Unit of the Linggang Bigung Public Health Centre****Results and Discussion****Result****Analyzes Univariate****1. Characteristics of Respondents****Table 1**

Distribution of Respondents' Characteristics Based on the Last Education at Linggang Bigung Public Health Centre in 2022 (N=22)

<b>Characteristics of Respondents</b>	<b>F</b>	<b>%</b>
<b>Education</b>		
No School	7	32%
Primary school	7	32%
Junior High School	4	18%
High School	0	0%
S1	4	18%
<b>Total</b>	<b>22</b>	<b>100%</b>

Source: Primary Data 2022

The results of the study based on table 1, most respondents had the last education of Elementary School as many as 7 respondents (32%) and not in school as many as 7 respondents (32%), respondents with S1 and Junior High School education had the same number of respondents as many as 4 respondents (18), while 0 respondents (0%) with the last education of Senior High School

**2. Uncontrollable Factors****Age****Table 2**

Risk Factors for Stroke by Age in Unique Technical Implementers Linggang Bigung Public Health Centre

<b>Characteristics of Respondents</b>	<b>F</b>	<b>%</b>
<b>Age</b>		
>55	14	64%
>65	8	36%
<b>Total</b>	<b>22</b>	<b>100%</b>

Primary Data Sources 2022

The results of the study, based on table 2, most respondents aged >55 years as many as 14 respondents (64%) and respondents aged >65 years as many as 8 respondents (36%).

**Overview of Risk Factors for Stroke in Stroke Patients in Work Area at Technical Implementation Unit of the Linggang Bigung Public Health Centre****Gender****Table 3**

Risk Factors for Stroke by Gender at Technical Implementation Unit Linggang Bigung Public Health Centre

Characteristics of Respondents	F	%
<b>Gender</b>		
Man	13	59%
Woman	9	41%
<b>Total</b>	<b>22</b>	<b>100%</b>

Primary Data Sources 2022

The distribution of respondents based on table 3, the majority gender is male as many as 13 respondents (59%) and respondents with female gender as many as 9 respondents (41%).

**Hereditary History of Stroke in the Family****Table 4**

Risk Factors for Stroke Based on Hereditary History of Stroke in the Family at Technical Implementation Unit Linggang Bigung Public Health Centre

Characteristics of Respondents	F	%
<b>Family History of Stroke</b>		
Already	6	27%
Do not	16	73%
<b>Total</b>	<b>22</b>	<b>100%</b>

Primary Data Sources 2022

The results of the study based on table 4 found that most respondents were 16 respondents (73%) had no family history of stroke and as many as 6 respondents (27%) had a family history of stroke.

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### 3. Controllable Factors

#### Hypertension

**Table 5**

Risk Factors for Stroke Based on History of Hypertension in the Technical Implementation Unit of Linggang Bigung Public Health Centre

Characteristics of Respondents	F	%
<b>History of Hypertension</b>		
Already	22	100%
Grade 1 hypertension (120-159/90-99)	3	14%
Grade 2 hypertension (>160/>100)	16	73%
Isolated systolic hypertension (>140/<90)	3	14%
Do not	0	0%
<b>Total</b>	<b>22</b>	<b>100%</b>

Primary Data Sources 2022

The results of the study based on table 5, it was found that all respondents in this study had a history of hypertension, namely as many as 22 respondents (100%) with level 1 hypertension as many as 3 respondents (14%), level 2 hypertension as many as 16 respondents (73%) and respondents with isolated systolic hypertension as many as 3 respondents (14%).

#### Diabetes Mellitus

**Table 6**

Risk Factors for Stroke based on History of Diabetes Mellitus in the Technical Implementation Unit of Linggang Bigung Public Health Centre

Characteristics of Respondents	F	%
<b>History of Diabetes Mellitus</b>		
Already	13	59%
Do not	9	41%
<b>Total</b>	<b>22</b>	<b>100%</b>

Source: Primary Data 2022

The results of the study based on table 6, respondents with a history of Diabetes Mellitus as many as 13 respondents (59%) and respondents who did not have a history of Diabetes Mellitus as many as 9 respondents (41%).

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### Smoke

**Table 7**

Risk Factors for Stroke based on Smoking Behavior in the Technical Implementation Unit of Linggang Bigung Public Health Centre

Characteristics of Respondents	F	%
<b>Smoke</b>		
Already	4	18%
Do not	18	82%
<b>Total</b>	<b>22</b>	<b>100%</b>

Source: Primary Data 2022

The results of the study based on table 7, as many as 18 respondents (82%) did not smoke and 4 respondents (18%) smoked.

### Alcohol

**Table 8**

Risk Factors for Stroke based on History of Consuming Alcohol in the Technical Implementation Unit of Linggang Bigung Public Health Centre

Characteristics of Respondents	F	%
<b>Alcohol</b>		
Already	4	18%
Do not	18	82%
<b>Total</b>	<b>22</b>	<b>100%</b>

Source: Primary Data 2022

The results of the study based on table 8, as many as 18 respondents (82%) did not consume alcohol and 4 respondents (18%) consumed alcohol.

### Obesity

**Table 9**

Risk Factors for Stroke based on History of Obesity in the Technical Implementation Unit of Linggang Bigung Public Health Centre

Characteristics of Respondents	F	%
<b>Obesity</b>		
Obesity	1	5%
Tidak Obesity	21	95%
<b>Total</b>	<b>22</b>	<b>100%</b>
<b>Body Mass Index</b>		
BMI $\geq 30$	1	5%
BMI $< 18.5$	3	14%
18.5-24.9	8	36%
25-29.9	10	45%
<b>Total</b>	<b>22</b>	<b>100%</b>

Source: Primary Data 2022

The results of the study based on table 9, in the obesity category there was 1 respondent (5%) who was obese with a BMI of  $\geq 30$ , respondents who were not obese as many as 21 respondents (95%) with a BMI of  $<18.5$  as many as 3 respondents (14%), BMI 18.5-25.9 as much as 8% and BMI 25-29.9 as many as 10 respondents (45%).

## **Discussion**

### **1. Characteristics of Respondents**

The results of research that has been conducted in the working area of Linggang Bigung Public Health Centre based on table 1, from the total respondents, most respondents as many as 7 respondents (32%) did not attend school as well as 7 other respondents (32%) who had the last elementary school education.

According to Notoadmodjo in (Pajri, Safri, & Dewi, 2018) states that the higher a person's education, the higher his understanding of something. So that the level of education has an important role in determining the quality of humans or as a mindset, the higher a person's level of education, the more qualified or better his life mindset.

Researchers (Pribadhi, Putra, & Adnyana, 2019), explained that although these results show insignificant differences, there is a tendency that people with low levels of education will have the potential to experience stroke events. A person's attitude to behave healthily can be determined by one's level of education, therefore, someone who has a higher level of education is expected to be able to absorb information about health and apply it in everyday life.

Supported by (Jessyca & Sasmita, 2021) low level of education inhibits a person from thinking more critically and is inhibited from understanding or drawing wisdom from an event. Ideally, the higher one's education, the better one's knowledge. Reinforced by (Handayani, 2019) Stroke patients should have a good level of knowledge about Stroke. Poor knowledge in stroke patients can be caused by low levels of education. Poor knowledge about stroke and risk factors when attacked by stroke can cause non-compliance of stroke patients to treatment and management.

The researchers' assumption is based on the results of research and theories that have been described that, education does not affect the incidence of stroke, but respondents with higher education status can easily get and absorb information about stroke.

### **2. Uncontrollable Factors**

#### **Age**

The results of the study, based on table 2 of the 22 total respondents, most respondents had a stroke when they were  $>55$  years old as many as 14 respondents (64%) and respondents aged  $>65$  years as many as 8 respondents (36%). Increased frequency of stroke along with increasing age is associated with the aging process, where all organs of the body experience deterioration in function including brain blood vessels. Blood vessels become inelastic, especially the endothelial part that has



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thickened in the intimate part, resulting in the lumen of blood vessels getting narrower and has an impact on decreasing blood flow (Pajri et al., 2018).

Research (Alchuriyah & Wahjuni, 2016) explained that the risk of stroke also increases with age, after the age of 55 years the risk increases 2-fold every 10 years in Holistic Health Solution. The process of degeneration will always accompany the aging process, including brain blood vessels, susceptibility to stroke increases with age, while in young people, stroke attacks are closely related to lifestyle and temperament that tends to be ambitious, the lifestyle of young people who allegedly trigger stroke.

In line with research (Pribadhi et al., 2019) the age group of 50-55 years is the age group that experiences the most incidence of stroke, the incidence of stroke markedly increases with age, twice every decade after the age of 55 years. However, it should also be seen that the mortality rate in stroke will increase in patients who are old and stroke is getting worse.

Reinforced by (Tamam, 2020) the risk of stroke in the age group  $> 55$  years is 3,640 times compared to the age group  $\leq 55$  years. This is related to the process of degeneration (aging) that occurs naturally in elderly people, where blood vessels become more rigid due to plaque attached to blood vessels. After the age of 55, the risk doubles every ten years. Two-thirds of all strokes occur in people over the age of 65.

The researchers' assumption that, age can affect the level of risk of having a stroke due to a decrease in body functions that occur with age.

### **Gender**

The distribution of respondents based on table 3, the majority gender is male as many as 13 respondents (59%) and respondents with female gender as many as 9 respondents (41%).

Stroke is often considered a monopoly disease of men, because men have the potential to have a stroke because women have the hormone estrogen which plays a role in maintaining immunity until menopause and as a protection or protector in the process of atherosclerosis, however, after the woman experiences menopause, the risk of stroke between men and women becomes the same (Alchuriyah & Wahjuni, 2016).

In line with (Pajri et al., 2018), that the risk of stroke in men is 1.25 higher than women, but stroke attacks in men occur at a younger age so that the survival rate is also high. Although less often affected by stroke, in general women are attacked in old age, so the possibility of dying is greater. Research assumptions based on the results of research and theories that have been presented that sex factors are related to the incidence of stroke due to a neglected lifestyle, especially men who more often have smoking behavior and consume alcohol which can increase the risk of stroke.

### **Hereditary History of Stroke in the Family**

The results of the study based on table 4 found that most respondents were 16 respondents (73%) had no family history of stroke and as many as 6 respondents (27%) had a family history of stroke.

Family history is one of the risk factors associated with the incidence of stroke. However, family history is not an independent risk factor for stroke. Researchers also explained that there was no significant relationship between family history and the incidence of stroke (Wayunah & Saefulloh, 2017).

Meanwhile (Alchuriyah & Wahjuni, 2016) said that family history of having had a stroke had a meaningful influence on family members to have a stroke at a young age with a risk level of 3.91 times compared to those who did not have a family history of stroke. The relationship between a family history of stroke and the incidence of stroke at a young age is in accordance with the theory that the offspring of stroke sufferers is known to cause changes in early atherosclerosis markers, namely the process of fat deposits under the lining of blood vessel walls that can trigger stroke.

The researchers' assumption is based on the results of research and theories from previous studies that, a history of stroke in the family is not an independent factor in the incidence of stroke, but respondents with a history of stroke in the family have a risk of having a stroke.

### **3. Controllable Factors Hypertension**

The results of the study based on table 5, it was found that all respondents in this study had a history of hypertension, namely as many as 22 respondents (100%) with level 1 hypertension as many as 3 respondents (14%), level 2 hypertension as many as 16 respondents (73%) and respondents with isolated systolic hypertension as many as 3 respondents (14%).

Hypertension is the main precipitating factor for the occurrence of stroke, both hemorrhagic and ischemic stroke. Hypertension causes an increase in peripheral blood pressure, causing a poor hemodynamic system and thickening of blood vessels and hypertrophy of the heart muscle. This can be exacerbated by smoking and eating foods high in fat and salt by patients which can cause atherosclerosis plaques. Hypertension that causes atherosclerosis plaques continuously will trigger stroke (Puspitasari, 2020).

In line with research (Wayunah & Saefulloh, 2017), that respondents who have a history of hypertension will be at risk of 7.5 times the occurrence of stroke. High blood pressure can affect the autoregulation of blood flow to the brain which has an impact on the acceleration of the emergence and intensity of atherosclerosis and the appearance of specific lesions in the intracerebral arteries. This lesion factor is an elusive symptom, but stenosis > 70% linearly associated with the risk of cerebral infarction.

Dian Nastiti's research in (Puspitasari, 2020) explained that of all stroke patients studied, the largest number had hypertension risk factors followed successively by prehypertension and normal blood pressure. In line with Mulyady, Waluyo, & Risdayanti, (2016) who explained that there were several respondents with normal blood pressure categories. This shows that there is no blood pressure level to be said to be the cause of stroke because even people with normal blood pressure can have a stroke.

The researchers' assumptions are based on the results of previous studies and theories that have been described that hypertension can be a factor in the incidence of stroke. High blood pressure that occurs continuously can cause disruptions in the flow of blood vessels in the brain, hypertension can also be triggered by an unhealthy lifestyle. However, individuals without hypertension also do not rule out the possibility of having a risk of stroke.

### **Diabetes Mellitus**

The results of the study based on table 6, respondents with a history of Diabetes Mellitus as many as 13 respondents (59%) and respondents who did not have a history of Diabetes Mellitus as many as 9 respondents (41%).

Diabetes mellitus is a metabolic disease with characteristics of hyperglycemia. Individuals with diabetes mellitus have a high sensitivity to the occurrence of atherosclerosis and are associated with other atherogenic risk factors especially hypertension, obesity, and dyslipidemia. Respondents with a history of diabetes mellitus have a risk of 1.5 times the occurrence of CVD-SH Stroke than CVD-SNH Stroke (Wayunah & Saefulloh, 2017).

Supported by (Pribadhi et al., 2019), in a community study that has been conducted suggests that insulin resistance in the absence of diabetes is associated with an increased risk of stroke. Increased insulin levels in nondiabetics are associated with a higher risk of stroke (RR increased by 1.19 per 50 pmol/L).

The researchers' assumption, diabetes mellitus can lead to stroke due to Diabetes Mellitus which accumulates in the walls of blood vessels which can lead to atherosclerosis, which can result in obstruction of blood flow.

### **Smoke**

The results of the study based on table 7 that has been conducted by researchers, from all respondents as many as 22 respondents found that 18 respondents (82%) did not have smoking behavior while in the results of this study it was also found that as many as 4 respondents (18%) had smoking behavior.

Smoking is a bad habit that brings disease, because in a cigarette contains more than 4000 substances and 2000 of them have an adverse impact on the health of the body, including radioactive material (polonium-201) and ingredients used in paint (acetone), floor wash (ammonia), silverfish (naphthalene), insect poison (DDT), termites (arsenic), toxic gas (hydrogen cyanide) and many others (Simbolon, Simbolon, & Ringo, 2018).

Researchers (Wayunah & Saefulloh, 2017) said that smoking behavior does not have a significant relationship with the occurrence of stroke, but smoking is one of the potential risk factors for cardiovascular disease and stroke. The incidence of stroke will increase when combined with other risk factors, especially hypertension. People who smoke have a 1.05 times risk of stroke.

In line with (Simbolon et al., 2018) which states that the trigger factor for stroke can be smoking, the risk of stroke is up to 3.5% and the risk decreases after quitting smoking and can be clearly seen in a period of 2-4 years after someone stops smoking. Reinforced by research (Zendrato, 2019) that smoking habits can increase the risk of suffering a stroke by 4.3 times. Smoking increases LDL cholesterol levels and lowers HDL cholesterol levels (Alchuriyah & Wahjuni, 2016).

The researchers' assumption is based on the results of research and theories that have been presented by previous researchers that, smoking behavior is not an independent factor in the incidence of stroke but smoking can be a potential factor in the incidence of stroke due to smoking which can result in increased cholesterol levels that are at risk of clogging arteries.

### **Alcohol**

The results of the study based on table 8 that has been conducted by researchers, from all respondents as many as 22 respondents it was found that 18 respondents (82%) did not consume while in the results of this study it was also found that as many as 4 respondents (18%) consumed alcohol.

Research explains that there is no significant relationship between alcohol consumption and the incidence of stroke (Hernawan, 2019). In line with, (Khairatunnisa & Sari, 2017) that there is no meaningful relationship between alcohol consumption and the incidence of stroke. Alcohol is toxic to the brain and at high levels can cause the brain to stop functioning. Alcohol has a secondary effect on increasing blood pressure that can trigger the risk of stroke. Heavy alcohol consumption is associated with four to seven times greater occurrence of stroke. Alcohol consumption behavior can increase the risk of 3.8 times stroke compared to those who do not have the behavior of consuming alcohol (Zendrato, 2019).

Researchers also explained that alcohol consumption causes hypertension which is the main trigger for stroke, this can be seen from respondents with a good diet, regular exercise, respondents who smoke cigarettes and do not smoke cigarettes but consume alcohol types of star beer and whiskey with ethanol content of 1-5% 1-5 glasses and 1-2 cans (with 330 ml contents) per day in 10-15 years of having a stroke (Sumaryati, 2016).

The researchers' assumption is based on the results of previous studies and theories that, alcohol is not an independent factor that can cause stroke, but consuming alcohol continuously coupled with other stroke risk factors can increase the incidence of stroke.

### **Obesity**

The results of the study based on table 9, at the time of experiencing the incidence of stroke there were respondents with an obesity category as many as 1 respondent (5%) who was obese with a BMI of  $\geq 30$ , while the average respondent at the time of having a stroke was not obese as many as 21 respondents (95%) with a BMI of  $<18.5$  as many

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as 3 respondents (14%), BMI 18.5-25.9 as much as 8% and BMI 25-29.9 as many as 10 respondents (45%).

Body mass index (BMI) is determined from the calculation of height and weight results, from the results of the body mass index determines a condition of a person said to have underweight, normal, and excessive. Those who are overweight tend to have higher blood pressure than those who are underweight. This is because the body of obese people has to work harder to burn the excess calories they consume (Alchuriyah & Wahjuni, 2016).

Research (Wayunah & Saefulloh, 2017) explained that the results found no relationship between obesity and the incidence of stroke. The direct relationship between obesity and stroke is not yet clear. However, obesity is usually associated with diet, type 2 diabetes, increased cholesterol levels and increased blood pressure that trigger the process of atherosclerosis. Especially those who experience central obesity (abdominal obesity).

Research (Siagian & Savitra, 2016) explained that in general the weight of stroke patients is normal, this is because weight gain is not the only risk factor that can cause stroke in this study. Obesity at all ages and genders adversely affects health status mediated by increased blood pressure, impaired glucose tolerance, insulin resistance, and other mechanisms that can increase the risk of stroke.

The assumption of researchers based on the results of research and theories that have been described, that obesity can lead to hypertension, increased cholesterol levels that trigger atherosclerosis which can lead to stroke.

## **Conclusion**

The conclusion in this study is that the largest risk factor for stroke is hypertension with a percentage of 100%, while the smallest risk factor for stroke is obesity with a percentage of 5%. On average, respondents have at least 2 risk factors for Stroke, Hypertension and Diabetes Mellitus.

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